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succeeds, and truth, in the legitimate sense of the abstraction, rather than loved truths. "Just as humanity is immortal, although men suffer death, so truth is eternal, although ideas perish, because ideas beget ideas as men beget men." ²³

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MUSIC AND EMOTION

THE esthetic emotions have long figured as one of the least understood parts of the subject-matter of psychology. Psychologists have called these emotions "pseudo-emotions." And, after bestowing upon them such an uncomplimentary title, they proceed to admit that upon the whole "they are something of a mystery." The name, "pseudo-emotion," seems to imply a suspicion that the arousal of emotion through the arts is in some sense not quite normal. Works of art are contrasted with ordinary stimuli as "artificial" to "natural" stimuli. However, when one recalls the age-long alliance between music and the dance, between music and religion, and between music and song, such a contrast seems to be inappropriate. The universality with which music is utilized as a means of man's self-expression would afford indication of the accommodation of the organism to such stimuli. The writer is convinced that, at bottom, music (and all the other arts, for that matter) rests upon the exploitation of that sort of exciting agency which is the "natural," innately appropriate, and adequate stimulus for the calling forth of an emotion through the excitation of the sense-organs. In this paper I wish to undertake to throw some little light upon the connection of music and emotion. The mechanics of the correlation admit of a certain amount of explication. I must preface my remarks, however, with the admission that I can offer little more than suggestions of the direction in which research, I believe, might profitably proceed.

The point of difficulty in understanding the connection of music and emotion is not the general fact that music arouses emotion, but the necessity of finding specific differences in the music-stimuli to account for the specific differences in the various emotions aroused. Air-vibrations seem to be a most colorless medium. That mere air-vibrations should form an exciting agency for the whole gamut of human feelings, its martial ardors, its loves and hates, its joyances and sadnesses, is truly an astounding fact! Equally astonishing in their own way, doubtless, are the effects of pigment and pencil, marble and bronze, and the word-jewelry of the poet. But the medium of music apparently is so diaphanous and intangible, and its

²³ "Savants et Ecrivains," page 175.

appeal so intimate and organically profound, that the ostensible inefficiency of air-vibrations to elicit such responses seems all the more glaring.

It is to be noted, to begin with, that the feelings evoked by sound are often regarded as less definite subjectively than feelings as ordinarily occasioned. In every-day cases of the experience of emotion we can generally specify the object which has called forth the emotion. Or, more correctly stated, the tangibility of objects and situations to which we react emotionally and the frequency with which certain practically identical situations lead to emotional response lend a definiteness to ordinary emotions that is obscured when the stimulus has the intangibility of tonal air-vibrations. With certain exquisitely organized individuals, however, musically evoked emotion appears to be as precise and meaningful as a beggar's rejoicing over the gift of a needed coin. How to explain this definiteness for some individuals is a somewhat involved problem.

Music arouses various kinds of emotions, and there must be some sort of differences between one bit of music and another to parallel the differences in the emotional responses the several pieces of music produce. Why one piece of music gladdens and the other saddens must ultimately be explained by differences in the sound-complexes. This is the crux of the problem. The question is: what differences in the various complexes of air-vibration can be found to account for the specific differences in the experiences of the listener?

On the one hand we have the emotion, on the other the stimuli, that is, air-vibrations. The emotions are varied. They are not vague, at least not to the musically enlightened. They possess a certain exactness, a definitive outline. Often we recognize and name them. Such and such music renders us gladsome; other tone-sequences depress. Some we call funereal. Other musical phrases are indubitably provocative of other frequently experienced emotional tones. If then the emotions differ specifically we must seek specific differences in the stimuli to correlate therewith, just as we correlate one vibration rate of the ether with a certain red, another with a certain green, and so on. Pieces of music resembling one another in emotional value we should expect to find resembling one another in structure. I hope to be able to show that such specific differences exist and such a correlation can be found.

There are two factors to be laid bare. The first concerns our innate organization. The second deals with the familiarization, through the experience of the individual, with certain musical conventions and the myriad associations that go to determine our reactions. It is obvious that the second depends on the first; it arises as a result of, and, as an inheritance, tends to develop further, the first factor.

The first factor is biological: the second is a product of history. The latter represents the elaboration and utilization of the material afforded by the first factor.

To begin with the first factor. For the purposes of this paper we need not consider in detail the various theories concerning emotion and instinct. The interrelation of the two is pretty generally admitted. Now it seems clear that certain types of stimuli are what may be called the organically appropriate and adequate stimuli for evoking instinct and emotion. Furthermore, the bodily expression of an emotion in one individual is often itself a sufficient stimulus to elicit a similar reaction in other individuals. One animal in a herd may be frightened by some unusual occurrence and this, as we say quite properly, is contagious, so that it is communicated to the others of the herd. Yet these others may not have been at all aware of the unusual occurrence. Similarly, with regard to human beings, we speak of the contagion of joy.

In the human being, too, an emotion may result from the occurrence of the appropriate stimuli. And certain broad differences in a given type of stimulus, such as sound, will determine general divergences in the responses. The manner in which the stimulation occurs, and of course the condition of the organism, will also be partial determinants. Thus a loud sound, unexpectedly sudden in its appearance, is apt to cause almost any one to experience fear. In the human herd, too, emotions will arise in one as an organic echo of a disturbance in another person. The infant vibrates emotionally in response to delicate shadings in the voice of the mother even before it understands her words. With increasing experience we learn to react to slighter and slighter differences in the intonation of voice and to subtler and subtler distinctions and nuances in stimuli. The effects secured by the art of acting depend largely on these facts. These slight differences, acquiring different sets of widely ramifying associations, become pulled further and further apart. As a consequence the reverberations of our organisms become more and more correlated with these nuances that may be undiscriminated by consciousness.

It is in this fact of our innate organization that determines us to respond to stimuli in certain more or less definite ways that I find the primitive link between music and emotion. To the extent to which a given piece of music considered as complex air-vibration resembles the vibration-complex which is the stimulus that, with reference to our innate organization, is the appropriate stimulus for a certain emotional response, to that extent will the piece of music evoke that same emotion. Neglecting minor elements in the process, we can put it in this way: if a sound-complex, characterized by mov-

ing in a certain range of pitch, with a general movement tendency within the range, and also distinctive in coloring owing to its over-tonic complex, larger and smaller periodicities of rhythm, and so forth, produces a given type of emotional reverberation; then a sound-complex represented by a piece of music that is known to evoke that same type of emotional excitement will be found to have a general resemblance to the first sound-complex. In the same manner the sound-complex of a human voice *expressing* this sort of emotion will resemble the two other sound-complexes. The vocal expression, the "musical" sound, and the organically appropriate stimulus will be found to resemble one another. They will not be identical, of course, but taken in the large they are similar. The music (which presumably is the resultant of an emotionalized condition of the composer) resembles the vocal expression of the emotion simply because the art of composing depends ultimately on the exploitation of what I have called the primitive link between stimulus and organic tendencies to respond.

We have a great deal of more or less direct evidence in support of this contention. Since the correlation between bodily attitude and expression on the one part, and the emotion, on the other, is rather definite, we may consider the resemblances of bodily expression and music and in this wise find the correspondences between the music and the emotion.

Consider martial music as an example. The readiness with which one falls into step in obedience to its rhythm, the erectness of bearing, the general tightening of the muscles, the flash of the eye, and the heightening of bodily tone can be observed in almost every listener. Of course, such attitudes are most apparent in the naïve unreflecting person, whose actions are not constrained by the petty inhibitions of convention; for some people seem to believe that they are lapsing into barbarism whenever they permit free expression to an emotion. Now consider the music itself. All martial music shows, as a rule, certain general uniformities. Its characteristic range of pitch which various examples approximate is indicated by the predominance of the brass in such music. The melody, the focal point of attention, is most frequently given to the brass, especially to such instruments as the cornet, trombone, and horns in general. Military music has always been the music of the brass. The walls of Jericho fell to the sound of trumpets! A certain vigor and obviousness of accent and forward propulsion characterize the rhythm, and the fitness with which the martial step conforms thereto is evident. And brass instruments, and, so far as I can discover, instruments like the fife and bagpipes, tend to approximate a characteristic wave-form. Such instruments are said to owe their timbre largely to the pre-

dominance of the higher overtones coincident with the relative feebleness of the lower overtones. These instruments form the center of gravity of a military band. Now in the same connection, consider the human voice. The martial thrill is apt to voice itself in upward tendencies of pitch within a range somewhat higher than in ordinary moments; it also is apt to become more vibrant, sharper, brighter. In this we see a general resemblance to the martial music. That is, the vocal expression resembles the musical expression, and both fitly parallel the bodily attitude.

I do not pretend, of course, to have exhausted all the factors in this account. Suffice it to show that there is a resemblance, and that various pieces of martial music resemble one another as much as various martial emotions resemble each other.

The dance affords further corroboration of my point. When dancing is an art, we find that the music, the bodily movements, and the emotional reactions show mutual congruity and compatibility. A striking, if somewhat notorious, example of this is to be found in the correlation of "rag-time" and what is called "rag-dancing." A musician once told me that the sorts of dancing, indiscriminately called "rag," were the true movement corrolaries of "rag-time" music. One has but to observe a negro ragamuffin dancing along the street to appreciate the truth of the statement.

The opera affords a more complex and yet more exact confirmation. Here the unity of effect is secured by the congruity and concordance of several elements: the music of the orchestra, the voice of the singer, the words sung, and the acting proper. We can sometimes discern that the music of the orchestra does precisely what the human voice (not necessarily a singing voice) would do when freely giving vent to the very same emotion that the music of the orchestra is supposed to portray. Examine similar tragic moments in the scores of various operas—they will be found to have certain general uniformities of structure. And the human voices in moments that are tragic resemble one another in pitch, tone-quality, and the like. Furthermore (and here is the essential point), the vocal expression and the music also resemble each other. Why then the music evokes that sort of an emotion is easy to see.

For illustration we can take Wagnerian motifs. The motif of Isolde's exaltation in the love-death, the motifs of the Redemption by Love, the Sword, the Siegfried, Guardian of the Sword, show similarities amidst their differences. And they are similar in type, although differing specifically, in their emotional value. The exaltation of Isolde, the exaltation of the Redemption by Love, the heroism of the Sword, and the Siegfried are all emotions that elevate and uplift. Perhaps we may make a very general division of emotions

into two classes: those whose tendency is uplifting and those whose tendency is depressing. The four motifs mentioned would then fall into the first class.

Now as regards the sound-complexes, all four show an upward tendency in pitch; the first two rise rather high in the scale of pitch. The latter two are enunciated principally by the brass, but move through a lower range of pitch; they lie well within the range that is associated, as seen in many examples of music, with the heroic, the valorous, and the martial. The interesting correlation is that all four move upward in the scale of pitch, all four are of the class we have dubbed uplifting, and this upward movement is generally characteristic of the human voice when expressing freely such emotions.

An illuminating contrast is afforded by motifs like the oath-motif, the dragon-motif, the fate and death motifs, and the music accompanying Hagen. They express the fearful, the awesome, the terrible, the tragic. Their range of pitch is low, very low; the movement is downward, and the sound-complex is properly rough and raucous. Consider the human voice under the dominance of the terrible, the awesome, the tragic—does it not evince the same general characteristics? It is certainly not smooth, mellow, or mellifluous; on the contrary, it is apt to be hoarse, cacophonous, low-pitched, even sepulchral.

Turn to songs. The analysis of a really successful one lays bare important correlations. Suppose that the song is a poem of real merit set to befitting music. It can be observed that the emotion verbally expressed is closely paralleled by the music: climaxes coincide; transitions from major to minor and the reverse coincide with similar transitions in the poem. And the singer's voice, obedient to the music, works in a manner similar to its changes if the poem were properly read instead of sung to music. Pushing the point further back, we see that the music is emotionally adequate because it has exploited the organically appropriate provocative of the emotion, and so parallels the vocal expression of the emotion.

This should be sufficient to indicate that there is a general analogy between the sounds in music which call up a certain type of emotion and the tendencies in the vocal sounds that commonly occur in the expression of that same emotion. So far, it is true, I have emphasized only the sound-complex, and there are other factors of great, if not of equal, importance. Tempo, for example, enters in decisively in some cases. We can sometimes infer from the gait of a man something concerning his mood. A brisk, tripping step is very different from a slow, heavy, dragging pace. Two tempos in music, so contrasted, differ as strikingly in emotional value. It is as difficult to conceive of a funeral march in anything but a slow, solemn tempo as it is to

imagine a mourner skipping along happily in the funeral procession. Sadness of heart and a nonchalant demeanor are as incompatible as a funeral march played in a gay swinging tempo is artistically impossible. And the artistic impossibility of the latter is directly dependent upon the physiological incompatibility of the former. Tempo, therefore, is also a determinant of the emotional value of sound.

Rhythms of a subordinate nature are also effective elements in calling to life emotional attitudes. Subordinate rhythms within the larger rhythm of the musical measure are often so prominent as to indicate national types of musical composition. In that musical glorification of the unexpected, "rag-time," these minor rhythms are the chief determinants of the effects of such music. It is worth noting in this connection that "rag-time" requires a rather peculiar sort of temperament and a rather definite sort of mood in the performer in order that it can be played in such a manner as to please even those to whom such productions are worthy of attention. At the hands of certain rare individuals, "rag-time" playing is almost an art. And the elements of the rendition that make it attractive to some persons are elements that are not indicated in the score. The performer literally has to read them into the score. In the last analysis it turns out to be mostly a matter of subordinate rhythm and accent.

There are still other lines of evidence that might be appealed to in corroboration of the general contention. Onomatopoetic words, vowel sounds, and the like, throw light upon the point. Sufficient has been given to show, however, that in music the primitive link which relates music to the heart of our inner lives, and so to human instinct and emotion, is the utilization of the innate correlations between sound-characteristics and emotion, and the additional fact that the habitual expression of an emotion on the part of one person is itself apt to evoke a similar emotion in others. Music has seized upon this connection, and in all its development has never disavowed it. In the history of the growth of musical theory and the means of musical expression, this innate correlation of stimulus and response is the starting-point, the propulsive force, and the raw material of the movement.

A word of caution is appropriate in this place. One must not over-rationalize the process of musical expression. One can not assume that the composer is aware of the psychological and physiological facts upon which his art depends. His choice of key, of mode, of tempo, of orchestral emphasis, is regulated by their felt appropriateness to his mood and emotion. Or if we say that such choices are determined by the technique of his art, that technique is

continually being justified by his reactions to the effects of the laws of his art. Musical theory did not create itself. Mathematical relationships may underlie all music, but mathematics did not give us music. And just as we must not over-rationalize the composer, we must not over-rationalize the auditor. The listener reacts immediately to the music; or if his attitude has the aloofness of critical judgment, the basis of the criticism is the felt appropriateness of the music.

So much for the innate factor. The second factor, the influence of experience, of associations and conventions, supervenes upon the innate factor and develops it. We learn to associate types of music with activities, events, sentiments, and moods. Think of the associations that cluster about a funeral march! Or a mass of Gounod! One may say that it is now a musical convention that a certain sort of music should have such and such a characteristic range of pitch, such and such tendencies within the range, and such and such tempos. But convention, however developed in the theory of the art, does not explain its own origin. Funeral marches have certain recognizable characteristics because at bottom such characteristics are an adequate means of expression for a given emotion and the adequate stimulus for the arousal of that emotion.

This does not diminish the significance of the rôle of history in our experiences of music. Intervals that are regarded as harmonious owe to history their acceptance as harmonious. Only a few decades ago augmented chords were scandalous bits of futurism. The daring of the whole tone scales of Debussy will probably have disappeared for the composers of a few decades hence. We shall learn to react to such things just as we have learned to react to the innovations of Wagner. Conventions and associations that determine our responses are as much a product of the development of music as they are a cause; and they are neither cause nor effect without the innate susceptibility of the organism of which so much has been said. Conventions, associations, familiarizations—in a word, the sum-total of our musical experiences—do not explain the intensity and imaginative sweep of our reactions. It is necessary to realize that such influences have their *raison d'être* in our innate structure.

A final objection remains to be met. It may be said that there is no such uniformity or constancy in our reactions as this contention would lead us to expect. We do not always respond to a given piece of music in the same way. Our responses vary from time to time and from individual to individual. To this objection, however, one might retort that there is as much constancy and uniformity in our reactions to music as there is in our reactions to anything at all. Besides, I believe it could be maintained that there is greater uni-

formity the higher the type of music considered. That uniformity may be obscured by the fact of the extreme complexity of a symphony as compared with a simple song, and the further fact that only a small minority of people react to any extent emotionally to the higher kinds of music. This may be due to lack of innate susceptibility, or lack of experience, or what not. After all, many are called to hear popular tunes, but few are chosen to hear symphonies. However this may be, I think the objection may be disposed of if it is remembered that a response is determined as much by the condition of the individual at the moment as by the stimulus.

It is apparent that if our position be tenable, the modern orchestra is the most adequate means that we possess of expressing that which can be expressed musically. This statement would doubtless receive general assent. There are tone-complexes that can not be produced save by the orchestra; there are literally some musical thoughts that can not be expounded save by the orchestra. The solo instrument, within the range of its possibilities, produces its effects by approximating the sound-complexes to which we are organically resonant. And the human voice is the most flexible of all instruments, for the stimulus it affords is the direct expression of an emotion.

When one considers the complexity of the phenomena which I have been trying to analyze, a lack of definiteness and simplicity of formulation in the results seems somewhat excusable. Many musical experiences remind one of religious experiences. The difficulty of analyzing the latter is well known. I have only striven to show that the power of music over those "whose heart-strings are a lute" is not wholly inexplicable. To such as these, the magic of tone and the wings that music lends to imagination are phenomena so profound that nothing less fundamental than inherited tendencies of our organism would afford a satisfying basis of explanation. Our responses to such stimuli themselves unavoidably suggest that the secret power of music arises from, and comes to rest in, certain intricate tendencies of our innate structure.

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THE SYSTEM OF TRANSCENDENTAL VALUES

A FEW years ago¹ the present writer offered certain suggestions on the problem of the classification of values. Three general groups were distinguished—factual, ideal, and transcendental values. The first group was defined as involving adjustment of the organism to its environment, and included the values of logical truth, utility,

¹ This JOURNAL, Vol. VII., pages 282-291.